ABSTRACT

A feed forward amplifier employing a new adaptive controller and method is disclosed. The controller aligns both a gain adjuster and phase adjuster of a first cancellation loop. The phase adjuster may be controlled following a standard approach. However, the gain adjuster is offset intentionally causing an incomplete cancellation, increasing the signal power passing through the error amplifier. If the gain adjuster is offset low, below the gain adjustment required to maximize carrier cancellation, peak power output from the main amplifier is reduced while the second loop maintains constant system output power. If the gain adjuster is offset high, peak power output from the error amplifier is reduced while the second loop maintains constant system output power. By controlling the gain adjuster offset from full first loop cancellation, the feed forward amplifier can be optimized for the power handling capabilities of the main and error amplifiers. A system and method of specifying and controlling the steady-state offset of the first loop gain adjuster is also disclosed. By altering the cost function of the first loop gain, the desired gain adjuster offset becomes the steady-state adjustment. Floors and penalties are incorporated into the first loop gain minimization approach to allow precise specification of the gain adjuster offset. The gain adjuster offset can be controlled at will to optimize the feed forward system even when the operating conditions or goals are varying.